Tutorial 9

1. A firm faces an inverse demand function P = 120-y and cost curve c(y)=500+y^2.

   (a) Together with the use of an appropriate diagram, calculate the profit maximising level of output and associated price. Calculate the consumer surplus, producer surplus, total surplus and dead weight loss.
   (b) The government wishes to impose a tax of £12 per unit of sale. What would be the effect on the optimum choice of output, price, consumers' surplus and producer's surplus. What is the tax revenue from this quantity tax?
   (c) What would be the effect if the government decides to just impose a lump sum tax of this amount (from b)? If the government wishes to maximise its own tax revenue by using a lump sum tax, explain how much it would charge.
   (d) If the government wants to enforce a price that will maximise consumer surplus, explain what that price would be.

2. A Glasgow University researcher, Peter Genius, has created a special drink which increases brain power. He faces a demand curve for the number of bottles: Q=200,000-10,000P. He has to spend £1000 to invest on the equipment necessary to manufacture the drink. The marginal cost is £5 per bottle.

   (a) What are the marginal revenue and marginal cost functions?
   (b) Peter has asked for your expert advice about the quantity he should produce and the price at which he should sell. His objective is to maximise profit. Calculate these and explain on a diagram.
   (c) Explain and calculate the consumer surplus, producer surplus and deadweight loss, with the use of the diagram.
   (d) The University decides that he needs to pay a fee of 10% on his profit to make improvements to the laboratory he did the research. What would be the profit maximising quantity and price? How much would be given to the lab?

3. The Ashton Cinema screens movies in a medium-sized University town. It shows unusual films and treats early-arriving movie goers to live organ music and cartoons. If the theatre is open, the owner has to pay a fixed nightly amount of £500 for films, ushers etc. If it is closed, we assume there is no cost. The nightly demand for movies shown in Ashton Cinema by students is Q^S= 220-40P^S. The demand by non-students is Q^N = 140 − 20P^N.

   (a) If a single price is charged for both types of customers, then at prices between 0 and £5.50,
      (i) what is the aggregate demand function for movie tickets?
      (ii) Calculate the profit maximising number of tickets and the associated price?
      (iii) How many tickets would be sold to students and how many to non-students?
      (iv) How much profits would Ashton Cinema make?
   (b) Suppose the cashier can accurately separate the students from the nonstudents at the door by making students show their school ID cards. Students cannot resell their tickets and nonstudents do not have access to student ID cards.
      (i) What price will be charged to each of these groups and how many tickets would be sold? Now how much?
      (ii) Now how much profit will be made?

4. Donald is about to open his newest amusement park, Elvis World, which features a number of exciting attractions: you can ride the rapids in the Blue Suede Chutes, climb the Jailhouse Rock and eat dinner in the heartburn Hotel. Donald estimates that a typical customer will take x=50-50p rides, where p is the price of a ride. The marginal cost of a ride is essentially zero.
   (a) Donald sets the price per ride which will maximise profits. Derive the number of rides which will be taken by one person per day, the price of a ride, consumer's surplus and producer's surplus
   (b) Explain and derive the Pareto efficient price of a ride and the associated number of rides per customer.
   (c) Advice Donald about how he can use a two-part tariff to his benefit.